

## MMS ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

Region: Alaska

Planning Areas: Beaufort Sea, Cook Inlet

Title: Surface Circulation Radar Mapping in Alaskan Coastal Waters: Field Study Beaufort Sea and Cook Inlet (AK-04-08)

**MMS Information Need(s) to be Addressed:** The Oil-Spill-Risk Analysis (OSRA) is a cornerstone to regional EISs environmental assessments, and oil-spill-contingency planning. MMS is being tasked with providing circulation and oil-spill-trajectory information at higher resolution than feasible or justifiable by current modeling state-of-the-art or current-meter technology. Information from this study will be used in NEPA analysis and documentation for Beaufort Sea Lease Sales, Cook Inlet Lease Sales, DPPs, and oil-spill-contingency plans.

**Total Cost:** \$946,000

**Period of Performance:** FY 2006-2008

**Conducting Organization:** University of Alaska Fairbanks

MMS Contact: [Chief, Alaska Environmental Studies Section](#)

### **Description:**

Background Over the past 25 years, oceanographic radar techniques have been developed and improved so that detailed, gridded, 2-dimensional maps of surface circulation can be provided and recorded in real time. Currents would play a critical role in the transport and fate of spilled oil, but there is paucity of direct circulation measurements in some areas of the Beaufort Sea and Cook Inlet. Current meters provide only data at specific points and not at the water surface, where the oil would be. These radar techniques provide a measured equivalent of a gridded circulation model and can be used as input to and validation for oil spill trajectory models.

Several entities, including MMS, NOAA, NOPP, IOOS, the University of Alaska Fairbanks, and oil industry have expressed interest in using circulation mapping radar techniques in Alaskan coastal waters. The radar units are expensive and cost and use-sharing rental agreements among multiple users is a preferred approach.

Objectives This study's objectives would be to field test the capability of the HF radar to collect near-real time surface current measurements in the Beaufort Sea from July (breakup of the landfast ice and opening of the offshore pack ice) through freeze-up and test the capability of the same units to collect surface currents in lower Cook Inlet for a period of a year. Analysis will compare surface currents to winds, subsurface currents, and ice concentration.

### Methods

1. Deploy radar units to the Beaufort Sea during the 2005 and 2006 field seasons.
2. Collect near real-time surface current measurements on an hourly basis over a publicly available Internet connection from West Dock east to the Endicott causeway and as far out on the continental shelf as technically feasible.

3. Collect surface current measurements from the end of breakup (July) through the formation of landfast ice in October.
4. Develop new routines to process the surface current measurements in ice covered waters of the Beaufort Sea
5. Analyze the processed surface current measurements against ice data, wind data collected from MMS meteorological stations on the North Slope and sub-surface currents collected from MMS Acoustic Doppler Current Profiler (ADCP) situated within the study area.
6. Produce a field report for Beaufort Sea 2005 and 2006 field seasons.
7. In October 2006, demobilize HF radar units in the Beaufort Sea and deploy to lower Cook Inlet for a one year test
8. Demobilize the units in Cook Inlet in November 2007
9. Process and analyze the data for Cook Inlet
10. Produce a final report for all years for the Beaufort Sea and Cook Inlet.
11. Produce a final geospatial database of all of the surface current measurements

**Current Status:**

Data processing of the 2005 and 2006 Beaufort Sea data is near completion. An annual report of the Beaufort Sea 2006 field season has been delivered to MMS and is under review. The data results from the 2006 Beaufort Sea field season were presented at the Ocean Science Meeting in Orlando, Florida.

**Final Report Due:** September 2008

**Publications Completed:**

Potter, R.A. et al: Processing High Frequency Radar Spectra in the Presence of Ice: 2008 Ocean Science Meeting, March 2008, Orlando, Florida

**Affiliated WWW Sites:** <http://www.mms.gov/alaska/>  
<http://www.salmonproject.org>

**Revised Date:** March 2008